
SECTION 15410 - BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The work under this Section of the Specifications includes the furnishing of all labor, materials, equipment and services required to provide complete plumbing systems. The contractor shall meet all performance requirements, all code requirements and regulations to make these system ready for regular operation and use by the Owner.

1.3 WORK INCLUDED

- A. Provide all labor, materials, services equipment, and transportation necessary to install, complete, and ready for continuous operation, all plumbing systems indicated on the Contract Drawings, as specified herein, or both, including, but not limited to, the following items.
- B. Sanitary, waste and vent system.
- C. Water service connections.
- D. L.P. Gas piping system.
- E. Domestic cold water and hot water piping systems.
- F. Plumbing fixtures and trim.
- G. Floor drains and cleanouts.
- H. Water storage heater.
- I. Hose bibbs/wall hydrants.
- J. Disinfection of domestic water lines.
- K. Insulation.
- L. Shop Drawings for materials and equipment.
- M. Tags, charts and pipe identification.
- N. Test and adjust piping systems and equipment.

- O. Record drawings.
- P. Instruction manual.

1.4 REFERENCES, CODES AND STANDARDS

- A. All work shall be installed in conformance with the governing codes, regulations, and ordinances. It shall be the responsibility of this Trade Contractor to familiarize himself with all governing codes and requirements and report any noncompliance of the plans and specifications to the Architect/Engineer, prior to entering into a contract, and all the above requirements shall take precedence over the plans and specifications. These requirements are minimum criteria and no reductions permitted by Code will be allowed without written permission of the Architect/ Engineer.
- B. All workmanship, methods, and materials shall meet the highest standards of the trade and, in general, shall conform to the standards of the following associations:
 - 1. Connecticut State Building and Plumbing Codes.
 - 2. American National Standards Institute (ANSI).
 - 3. American Society of Testing Materials (ASTM).
 - 4. Requirements of State of Connecticut.

1.5 SUBMITTALS

- A. Submit for approval of the Architect/Engineer shop drawings for equipment and materials proposed for installation. Drawings shall be catalog cuts, material lists, and samples where necessary, containing complete performance data, dimensions, descriptions and installation requirements and particulars under provisions of Section 01300. Submittals shall not be limited to, but shall include:
 - 1. Pipe and fittings.
 - 2. Valves.
 - 3. Floor drains and cleanouts.
 - 4. Thermometers and gauges.
 - 5. Hose bibbs and wall hydrants.
 - 6. Insulation.
 - 7. Plumbing fixtures and trim.
 - 8. Shock absorbers.

9. Water heaters.
10. Color samples for pipe coding system
- B. Submit copies for approval and record of:
 1. All tests
 2. Valve chart
 3. Pipe color code chart
- C. Shop drawings shall include locations of pipe sleeves, inserts, and other openings which pass through or into concrete construction. Drawings shall be prepared at earliest practicable date to expedite orderly progress of the work.
- D. Tabulate products by Section Number and Paragraph.

1.6 DRAWINGS

- A. Drawings are generally diagrammatic and are intended to convey the general arrangement of systems, the scope of work, and the function of those systems.
- B. The exact arrangement and location of piping and equipment shall be determined from shop drawings and actual field coordinated measurements and conditions. The Trade Contractor shall provide a neat workable installation utilizing good operating practices and good craftsmanship. The exact locations necessary to secure the best conditions and results will be determined at the project with the approval of the Architect/Engineer before proceeding with the installation.
- C. Follow the drawings in laying out the work and check the drawings of other trades to verify spaces in which the work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate notify the Architect/Engineer before proceeding with the installations.
- D. As approved by the Architect/Engineer, make reasonable modifications in the layout as needed to prevent conflict with the work of other trades, or the proper execution of the other trades, or for the proper execution of the work.

1.7 LAWS, ORDINANCES AND INSPECTIONS

- A. File all necessary drawings and specifications, prepare all documents and obtain all required Certificates of Inspection for work, and deliver same to the Architect/Engineer before submitting the request for acceptance and final payment for the work.
- B. All materials furnished and all work installed shall comply with all requirements of local utility companies, with the recommendations of local utility companies, and with the requirements of the State of Connecticut.

1.8 NAMEPLATES

- A. Manufacturer's nameplates or trademark shall be permanently affixed to all equipment and materials furnished under this specification. The nameplate of a subcontractor or distributor is not acceptable.
- B. Project Nameplates - Identify each item of equipment including controls with a permanently attached project nameplate, identifying each piece of equipment as identified on the Equipment Schedule or on the drawings.
 - 1. Project nameplates shall be at least one inch high engraved with letters at least one-half inch high.

1.9 PROTECTION

- A. Materials, equipment and fittings shall be properly protected and all pipe openings shall be temporarily closed so as to prevent obstruction damage.

1.10 SURVEYS AND MEASUREMENTS

- A. This Trade Contractor shall base his measurements, both horizontal and vertical, from referenced points established by the General Contractor and shall be responsible for correct laying out of his work.
- B. In the event of discrepancy between actual measurements and those indicated, notify the General Contractor in writing and do not proceed with this work until written instructions have been issued by the General Contractor.

1.11 COORDINATION

- A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the project.
- B. Furnish advance information on locations and sizes of all frames, boxes, sleeves, and openings needed for his own work to the other trades. Furnish information and shop drawings necessary to permit trades affected by fire protection work so that the other trades may install their work properly and without delay.
- C. Where there is evidence that plumbing work will interfere with the work of other trades, this Trade Contractor shall assist in working out space conditions to make satisfactory adjustments.
- D. Make reasonable modifications in the work as required by normal structural interferences, pay all expenses to the General Contractor for additional openings or relocating or enlarging existing openings thru concrete floors, walls, beams and roof provided for fire protection work.
- E. If plumbing work is installed before coordinating with other trades, causing interference with the work of such trades, make all necessary changes in the work to correct the condition without extra cost.

- F. Protect all materials and work of other trades from damage that may be caused by plumbing work and be responsible for repairing any damages caused.

1.12 CUTTING AND PATCHING

- A. Sleeves, inserts, anchor bolts and similar items set into concrete or masonry or the work of other trades shall be furnished and installed by the Trade Contractor. The Trade Contractor shall be responsible for all such items necessary to hang or support his work.
- B. When finished materials of other trades must be cut or fitted in the shop, furnish the necessary drawings for transmittal to the trades whose materials must be cut or fitted.
- C. Do all drilling and cutting of small holes in concrete walls and floors as required for sleeves and supports with the approval of the General Contractor.

1.13 INSTALLATION

- A. Provide all tools, machinery, riggings, scaffolding, blocking, shoring, or protective work necessary for proper completion of the work, and remove all waste material.

1.14 LABOR

- A. Provide all transportation, freight, loading, and unloading, and provide all labor necessary for erecting in place all material and equipment shown, specified or required for completion of the plumbing work.

1.15 UTILITIES

- A. Provide all utilities such as water, fuel, electricity for all tests associated with or specified for the plumbing work.
- B. Owner shall supply single-phase power for equipment where locally available.

1.16 OPENINGS IN EXTERIOR WALLS

- A. Openings in exterior walls shall be made under the direction of the General Contractor.
- B. Provide for temporary closings as work progresses.

1.17 TEMPORARY OPENINGS

- A. Arrange with the General Contractor to provide special temporary openings in the structure as required for the admission of apparatus furnished as part of the plumbing work.

1.18 ACCESSIBILITY

- A. Install all work so that all parts required are readily accessible for inspections, operation, maintenance, and repair. Minor deviations from the drawings may be made for this purpose,

but changes of magnitude shall not be made without prior written approval of the Architect/Engineer.

1.19 ACCESS PANELS

- A. Access panels for walls, ceilings and floors at locations indicated on drawings or as required to permit access for adjustment, removal and replacement, and servicing of all concealed plumbing equipment requiring access and all other items requiring maintenance and adjustment will be furnished as specified under Section 08305, by this Trade Contractor.

1.20 PORTABLE OR DETACHABLE PARTS

- A. The plumbing Contractor shall retain in his possession and shall be responsible for all portable and detachable parts and portions of the installation and all other devices or materials that are relative to and necessary for the proper operation and maintenance of the plumbing systems until final completion of the work.
- B. Replace all stolen, lost, or damaged items relative to the installation and operation of the plumbing systems before the building is accepted.

1.21 GUARANTEE

- A. The Trade Contractor shall guarantee the entire system and all work for one year dating from time of final acceptance. He shall remedy, to the satisfaction of the Architect and Engineer, all defects in his work and replace all defective apparatus and materials. It shall be the responsibility of this Trade Contractor to obtain from the equipment manufacturers guarantees covering their respective equipment for the above period of time.
- B. If any part of a system should be stopped by foreign matter being placed in operation, disconnect the system, clean, and reconnect wherever necessary to locate and remove obstructions. Repair or replace any work damaged in the course of removing obstructions.
- C. Furnish written factory guarantees for all equipment.

1.22 BASES AND SUPPORTS

- A. Provide all bases, supports, and equipment foundations, not part of the building structure, of required size, type, and strength as approved by the Architect/Engineer for all equipment and materials.
 - 1. Foundations shall be four inches high, unless noted otherwise, concrete pads with reinforcing steel, anchors, preparation and other details of construction conforming to the requirements specified in Division 3.
- B. Anchor all equipment, bases, and supports to the building and structures to prevent shifting of position under operating conditions.
- C. Furnish all required foundation sizes, bolts, washers, sleeves, plates and templates for plumbing equipment.

- D. The size and type of the foundation bolts shall be as recommended by the manufacturer.
- E. All equipment shall be set on the foundation and shimmed, level with steel shims and grouted under base with non-shrink grout for uniform bearing.

1.23 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS

- A. Furnish and install all supplementary steel and structural supports required for the proper installation, mounting and support of all equipment.
- B. Supplementary steel and channels shall be firmly connected to building construction in a manner approved by the Architect, as specified.
- C. The type and size of the supporting steel shall be determined by the installer and shall be of sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements.
- D. All supplementary steel shall be installed in a neat and workmanlike manner parallel to the walls, floor and ceiling construction. All turns shall be made with 90 degree and 45 degree fittings, as required to suit the construction and installation conditions.
- E. All supplementary steel supports and fittings shall be galvanized structural steel or roll formed steel as manufactured by Unistrut, Power-Strut, or approved equal.

1.24 TYPICAL DETAILS

- A. Where shown on the drawings, typical details shall apply to all similar items. Any alternate method requires prior approval of the Architect/Engineer.

1.25 COORDINATION AND FABRICATION DRAWINGS

- A. As the work progresses, submit coordination drawings to scale for equipment rooms and the areas of possible conflicts requiring close coordination with all other trades, refer to Section 01300.
 - 1. Coordination drawings of piping and equipment shall show the work at all floors and shafts. Coordination drawings shall be submitted to the General Contractor to include the work of all other trades.
 - 2. Coordination drawings shall show plumbing systems installation and possible conflicts with the work of other trades. The General Contractor may request revisions. Make such revisions to composite system drawings, when requested.
 - 3. Coordination drawings for concrete equipment bases, housekeeping pads, equipment supports, etc. shall be made from approved shop drawings or obtained from physical inspection of equipment to be relocated.

- B. Prior to submission of coordination drawings, check with approved equipment shop drawings to ascertain that they comply with the Contract requirements; that the mechanical and electrical characteristics are correct; and that the dimensions of work submitted fit the available space. Any deviations from the Contract requirements shall not be acceptable without prior approval from the Architect/ Engineer.
- C. Submit coordination drawings under provisions of Section 01300.

1.26 EXCAVATION AND BACKFILLING

- A. All excavation and backfilling required for equipment and piping installed under this Section will be performed under Section 02300, EARTHWORK
- B. Furnish all required information as to the locations, sizes, grades and elevations of all conduit, equipment and foundations requiring excavation.
- C. The minimum width of trenches for pipes shall be such as to give a clearance of at least eight inches on each side of fittings.
- D. All irregularities in the trench bottom or where the excavation has exceeded the depth required shall be filled with sand properly compacted to the required depth.

1.27 TEMPORARY ELECTRICITY

- A. Temporary electric service shall be provided as specified in Section 01500.

1.28 TEMPORARY WATER

- A. Temporary water shall be provided as specified in Section 01500 - Temporary Water.

1.29 REMOVAL OF RUBBISH

- A. Keep the building and site clean from the accumulation of rubbish and waste materials and, upon completion, leave the building, site and installation in a clean condition, completely acceptable to the General Contractor.

1.30 SAFETY PRECAUTIONS

- A. Comply with all of the safety requirements of OSHA throughout the entire construction period of the project.
- B. Furnish and maintain proper guards for prevention of accidents and provide any other necessary construction required to secure safety of life and property.

1.31 SELECTION AND ORDERING OF MATERIALS

- A. Arrange for purchase and delivery of materials and equipment required in ample quantities and at proper time. Immediately notify the General Contractor of any inability to obtain suitable delivery of any apparatus or materials required.

1.32 TESTING AND ADJUSTING

- A. Test all work and systems and make all adjustments and corrections as required to provide a complete, first-class working system.
 - 1. Provide all labor, materials, and instruments necessary for completion of tests under observation of local authority and designated inspectors.
 - 2. Make all adjustments, place systems and equipment in operation and demonstrate proper functions of equipment, controls and systems.

1.33 MAINTENANCE MANUALS

- A. Provide four bound manuals containing operating, installation, and maintenance instruction for all equipment in conformance with provisions of Section 01700.

1.34 INSTRUCTION TO OWNER'S PERSONNEL

- A. Provide instructions to Owner's personnel in conformance with provisions of Sections 01700.
- B. Provide the necessary skilled personnel to operate the entire installation for a period of one day.
- C. During the operating period, instruct the Owner's representatives in the complete operation, adjustment and maintenance of the entire installation.
- D. Confirm in writing to the Architect/Engineer the name and title of the instructor, the name(s) of Owner's personnel instructed, the date and the number of hours of instruction for each item of equipment or system.

1.35 SUBSTITUTIONS

- A. Substitutions for specified equipment shall be made only in conformance with provisions of Section 01300.

1.36 POWER WIRING

- A. All power wiring shall be provided under Division 16 and as shown on Electrical drawings.
- B. All interlock and control wiring shall be furnished, installed and connected, including conduit, under this Section.

1.37 ELECTRIC WORK

- A. Electrical wiring for equipment required under Division 15 as part of the plumbing system, and which is not provided under Division 16 such as control and interlock wiring, enclosures for protective or control devices, circuit breakers, motor starters, contactors, switches, and control panels shall conform to the requirements of Division 16.

B. Capacity correction.

1. Each 3 phase, 60 Hz motor, 10 hp and larger shall have correction capacitors to raise full-load power factor to 0.95 or better.
2. Capacitors shall be selected on basis of nominal motor speed in rpm and number of poles of motor being corrected.
3. Capacitors shall be equal to Type CEU manufactured by Sprague Electric Company, North Adams, Massachusetts 01247.

1.38 CATHODIC/ELECTROLYTIC PROTECTION

- A. Connections between dissimilar metals shall be made with dielectric connectors. Dielectric connections shall be manufactured for that purpose.
- B. Metal objects buried in the earth shall have adequate cathodic protection.

1.39 FASTENERS

- A. Necessary bolts, anchor bolts, nuts, washers, plates, and bolt sleeves for mechanical work shall be included. Anchor bolts shall have suitable washers, lock washers, and hexagonal nuts.
- B. Bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be galvanized, unless otherwise indicated or specified. Threaded items shall be galvanized after threading in accordance with ASTM A 123 or A 153, as appropriate.
- C. Expansion bolts shall have malleable iron and lead composition elements of required size.
- D. Stud, tap, and machine bolts shall be refined bar iron, unless otherwise specified, with hexagonal nuts of same quality metal as bolts. Threads shall be clean cut, conforming to ANSI B1.1.
- E. Where specified, bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel.
- F. Suitable templates shall be provided for anchor bolts to be cast in concrete.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 15410

